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10/827,405

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EXAMINER

WERNER, DAVID N

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/827,405	Applicant(s) KIM ET AL.	
	Examiner David N. Werner	Art Unit 2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 March 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-58 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-58 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 April 2004 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office action for US Patent Application 10/827,405 is responsive to communications filed 21 March 2008, in reply to the Non-Final Rejection of 21 December 2007. Currently, claims 1-58 are pending.

2. In the previous Office action, claims 57 and 58 were rejected under 35 U.S.C. 101 as non-statutory. Claims 1, 12, and 57 were rejected under 35 U.S.C. 103(a) as not enabled. Claims 20-23, 29, 30, 32, 39-41, 47, 48, and 50 were rejected under 35 U.S.C. 103(a) as obvious over US Patent 5,502,492 A (Jung) in view of US Patent 4,944,023 (Imao et al.). Claims 24, 28, 31, 42, 46, and 49 were rejected under 35 U.S.C. 103(a) as obvious over Jung in view of Imao et al. and in further view of US Patent 5,903,669 A (Hirabayashi). Claims 1-19, 25-27, 33-38, 43-45, and 51-58 were rejected under 35 U.S.C. 103(a) as obvious over Jung, Imao et al., and Hirabayashi, and in view of US Patent 5,796,434 A (Lempel).

Response to Amendment

3. Applicant's amendment to the specification has been fully considered. However, this amendment is insufficient to overcome the rejection of claims 57 and 58 under 35 U.S.C. 101.

4. Applicant's amendment to the claims has been fully considered. The rejection of claims 1, 12, and 57 under 35 U.S.C. 112, first paragraph, is withdrawn.

Response to Arguments

5. Applicant's arguments filed 21 March 2008 have been fully considered but they are not persuasive. Applicant argues that Jung does not teach the claimed limitation of determining a block mode based on the motion vectors of subblocks in claim 20, but rather, the difference between the current frame block and a motion compensated previous frame block. First, applicant asserts that the statement in the prior Office action that "If the number of subblocks having an identical displacement is larger than a certain threshold...then the motion vector for the current panning block is the overall panning block motion vector determined from panning vector 30" was due to a typographical error, and should have instead read "the motion vector for the current subblock is the overall panning block motion vector". This is incorrect. Support for the interpretation stated in the prior action may be found in column 5: lines 12-14, which reads, "The selected subblock motion vector at the second multiplexer 224 is assigned as the panning vector **for the panning block**" (emphasis added).

Next, considering the generation of the block mode in Jung, while it is true that ultimately, the block mode is determined based on the comparison of a motion compensated block with an original reference block (column 5: lines 30-51), the choice between a subblock motion vector and a panning vector (column 5: lines 43-51) may only be offered when choices of both motion vectors exist. However, when the number of identical subblocks is smaller than the threshold number, (that is, when motion vectors of sub blocks are not similar, to use the language of claim 20 of the present invention), there is no overall panning motion vector (column 5: lines 21-25). In this

case, the multiplexer 28 is only left with a Hobson's choice of the block mode in which the plurality subblock motion vector is used (column 5: lines 46-48). Then, since in Jung, even the option and availability of block mode choice is dependent on the similarity of subblocks, the block modes themselves are inherently determined by the similarity. Therefore, the rejection of claim 20 over Jung is respectfully maintained.

Claim 39 was not discussed on its own merits, but only as co-extensive in scope with claim 20, and claims 21-24, 28-32, 40-42, and 46-50 were only discussed as dependent on claims 20 and 39.

Regarding claim 1, Applicant first makes a brief statement disagreeing with Examiner's discussion of the claim in relation to claims 20 and 24-26, and secondly, argues Jung's alleged failure to disclose "determining a block mode depending on whether two motion vectors are similar" in claim 1, similar to the argument regarding claim 20.

Regarding Applicant's statement that the interpretation of claim 1 with respect to claims 20 and 24-26, Applicant is reminded that a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references is not considered responsive to an adverse action. See 37 CFR 1.111(b).

Regarding the alleged deficiency of Jung with respect to claim 1, see the rebuttal of the argument of claim 20 *supra*.

Claims 12, 57, and 57 were not discussed on their own merits, but only as co-extensive in scope with claim 1, and claims 2-11, 13-19, 25-27, 33-38, 43-45, and 51-56 were only discussed as dependent claims.

Claim Rejections - 35 USC § 101

6. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 57 and 58 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette Notice of 22 November 2005), Annex IV, read as follows:

In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See *Lowry*, 32 F.3d at 2583-84, 32 USPQ2d at 1035.

Claims that recited nothing but the physical characteristics of a form of energy, such as a frequency, voltage, or the strength of a magnetic field, define energy or magnetism, *per se*, and as such are nonstatutory natural phenomena. See *O'Reilly*, 56 U.S. (15 How.) at 112-114. Moreover, it does not appear that a claim reciting a signal encoded with functional descriptive material falls within any of the categories of patentable subject matter set forth in Sec. 101.

...a signal does not fall within one of the four statutory classes of Sec. 101.

...signal claims are ineligible for patent protection because they do not fall within any of the four statutory classes of Sec. 101.

Claims 57 and 58 are drawn to a "computer-readable recording medium" "recording" functional descriptive material. Normally, the claims would be statutory.

However, the specification, at amended paragraph 196, define the claimed computer-readable medium as encompassing statutory material such as a "memory", or a "disk", as well as *non-statutory* subject matter such as "any recording apparatus" or "code in a distributed system".

A signal embodying functional descriptive material is neither a process nor a product (i.e., a tangible "thing") and therefore does not fall within one of the statutory classes of §101. Rather, a signal is a form of energy, in the absence of any physical structure or tangible material. See *In re Nuijten*, 84 USPQ2d 1495 (Fed. Cir. 2007). Because the full scope of the claims as properly read in light of the disclosure encompasses non-statutory subject matter, the claims as a whole are non-statutory.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 20-23, 29, 30, 32, 39-41, 47, 48, and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5,502,492 A (Jung) in view of US Patent 4,944,023 (Imao et al.). Jung teaches a motion vector determining system in which large "panning blocks" in a video frame are subdivided into smaller "subblocks", and the motion vectors of these subblocks are calculated. Regarding claims 20, 39, and 58, in Jung, subblock motion vector detector 20 detects motion vectors for each of the

subblocks of the larger panning blocks within a frame (column 3: lines 7-28). This corresponds with step (a) of the method of claim 20 and the motion estimator of claim 39. Motion vector detector 20 in Jung includes a set of shifting and blocking circuits 114-118, which produce motion vectors, and also includes a set of comparators 12—124, which produces error, or difference values (column 3: line 47—column 4: line 9). These error values correspond with the claimed “predetermined measure”. Motion vector detector 20 of Jung also includes a subblock divider 110, which divides a large panning block into the several subblocks (column 3: lines 47-53). This corresponds with the claimed “block divider” of claim 39. Next, the number of subblocks that have an identical displacement is determined (column 4: lines 33-44). If there are multiple sets of subblocks with different identical displacements, the displacement with the largest number of subblocks is used (column 4: lines 45-59). If the number of subblocks having an identical displacement is larger than a certain threshold, preferably 30% of the subblocks in the panning block, then a panning motion vector for the current panning block is generated (column 5: lines 4-29). The final decision of whether to choose the plurality subblock motion vector or panning motion vector for the block is determined based on a test motion compensation of the panning vector (column 5: lines 30-57), but this choice may only be made when the two candidates both exist. Then, the determination of the motion vector mode in Jung corresponds with step (c) of the method of claim 20 and claim 41. However, in Jung, there is only one subdivision of blocks into subblocks, not a plurality of subdivisions of subblocks into a second series of subblocks.

Imao et al. teaches a method of describing an image by recursively dividing an image. Regarding claims 20 and 39, in Imao et al., several embodiments exist, but all are directed to recursively dividing an image of n-dimensional space into 2^n regions until each of the regions contains only one kind of region (column 1: line 52–column 3: line 34). This corresponds with step (b) of the method of claim 20 and the block mode determination unit of claim 39.

Jung discloses the claimed invention except for hierarchically or recursively dividing image blocks into subblocks. Imao et al. teaches that it was known to recursively divide an image into subregions. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the recursive division of images of Imao et al. for the single-level division of Jung to obtain the predictable result of determining, with variable granularity, which areas of an image have the same motion vector, since it has been held that simple substitution of one known element of an invention for another to obtain predictable results has been found to be within the level of ordinary skill in the art. See *In re Fout*, 675 F.2d 297, 301, 213 USPQ 532, 536 (CCPA 1982); *In re O'Farrell*, 85 F.2d 894, 903, 7 USPQ2d 1673, 1681 (Fed. Cir. 1988); *Ruiz v. AB Chance Co.*, 357 F.3d 1270, 69 USPQ2d 1686 (Fed. Cir. 2004), and *Ex parte Smith*, 83 USPQ2d 1509 (BPAI 2007).

Regarding claim 21, in Imao et al., a tree is formed by recursively dividing a region into four subregions, and determining if the subregions are uniform. If the subregions are uniform, then the current region becomes a leaf node in the tree (column

7: lines 28-56). This corresponds to step (a1). The values of the four subregions of the current region, if uniform, correspond to the claimed combined values of the measure function in step (a2). Regarding claims 22 and 40, in Imao et al., uniformity is determined according to similarity of a value in a region. In the example given in Imao et al., a binary image is used, and the value is the color of the region (column 8: lines 18-42).

Regarding claim 23, in Jung, as stated above, if a certain number of subblocks above a threshold have an identical displacement, then the motion vector for the panning block is the one taken for the panning block as a whole from the panning vector detector (column 4: lines 4-15).

Regarding claims 29 and 47, in Jung, motion vectors are considered similar if they have an identical displacement (column 4: lines 30-44).

Regarding claims 30 and 48, in Jung, motion vector error may be determined in one of several standard methods, including mean-square error.

Regarding claims 32 and 50, a limit L is defined as a number in a sequence $a(n)$ such that for every small $\varepsilon > 0$, there exists a number N such that the absolute difference between the n th or greater value in the sequence and L is less than ε . See *Mathematical Thinking* (D'Angelo et al.), pg. 259. In other words, if a limit of a sequence exists, it is possible to arbitrarily approach the limit over the sequence. In the present case, the "difference between values of two measure functions" is $a(n)$ for n greater than or equal to N , L is zero, and ε is the predetermined range. N is the

Art Unit: 2621

boundary for determining similarity. Two functions are similar at a given block if the difference between their values at that block can arbitrarily approach zero.

9. Claims 24, 28, 31, 42, 46, and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jung in view of Imao et al. as applied to claim 20 above, and further in view of US Patent 5,903,669 A (Hirabayashi). Claims 24 and 42 of the present invention are directed to dividing a 16 x 16 pixel macroblock into four 8 x 8 sub blocks. However, in Jung, the subblocks, not the large blocks, are size 16 x 16 pixels (column 3: lines 50-51), and in Imao et al., although regions are divided into northwest, northeast, southwest, and southeast subregions (column 5: lines 13-16, 41-48), it is not specified that the first division is into regions of size 16 x 16 pixels and subregions of size 8 x 8 pixels. Additionally, Claim 28 of the present invention is directed to determining a block mode based on the amount of data produced from the preliminary block modes, whereas Jung determines block mode based on the accuracy of prediction of the block from the preliminary block modes.

Hirabayashi teaches an image processing system that produces blocks of various sizes. Regarding claims 24 and 42, in figure 1 of Hirabayashi et al., block forming unit 1 first divides an image into square blocks each having 16 by 16 pixels, and block size discrimination unit 2 determines if the blocks will further be divided into subblocks. Subblock forming unit 3 then divides the blocks into subblocks (column 2: lines 39-55). The 16 by 16 pixel blocks are first divided into 8 x 8 subblocks, and further

Art Unit: 2621

into 4 x 4 subblocks, 2 x 2 subblocks, and 1 x 1 pixel subblocks, if necessary (column 3: lines 1-15).

Regarding claims 28 and 46, Hirabayashi determines whether to subdivide a block by comparing the amount of data produced by the block and the combined data from the four subblocks from the division of the current block (column 3: lines 20-25).

Regarding claims 31 and 49, recall that in Hirabayashi, the determination of coding mode is made with respect to the amount of data coded in each coding mode (column 3: lines 20-25). In addition, in the figure 9 embodiment of Hirabayashi, data is transformed by differential coding (column 5: line 38–column 6: line 42). A difference between the average pixel value in the data block and each pixel in the data block is output in this embodiment, and so the amount of data output is a sum of absolute transformed difference.

Jung, in combination with Imao et al., teaches the known invention except for determining block mode based on amount of data produced. Hirabayashi teaches that it was known to determine a block coding mode based on the amount of data produced from a large block or a combination of subblocks. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to determine whether to encode a block as a large block or as a series of subblocks according to the amount of data produced, as taught by Hirabayashi, since Hirabayashi states in column 1: lines 49-57 that such a modification would increase the compression ratio of the encoded video.

10. Claims 1-19, 25-27, 33-38, 43-45, and 51-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jung, in view of Imao et al. and Hirabayashi, as applied to claims 24 and 42 above, and further in view of US Patent 5,796,434 A (Lempel). Claims 25-27 and 43-45 are directed to determining if motion vectors of adjacent blocks are similar. However, Imao et al. and Hirabayashi produce strict quadtree subdivisions of blocks, not producing additional modes in which two adjacent subblocks can be combined based on similarity.

Lempel teaches a motion vector estimation system that operates in the transform domain. Lempel first divides images into target blocks for motion vector search (column 6: lines 18-35), and determines the target block in a target frame that is the most similar to a current block in a current frame (column 6: lines 36-53). Next, the target blocks and current block are divided into subblocks, and the DCT is taken over the subblocks (column 6: lines 55-63). The DCT for each of the subblocks is stored in a memory, so they can be re-used if needed in additional calculations (column 6: lines 6—63), such as re-combining two subblocks into larger regions, as will be explained in greater detail below.

Regarding claim 25 and 43, in Lempel, a search frame is additionally partitioned into horizontal bands of size 16 x 8 pixels (column 6: line 64—column 7: line 4; column 17: lines 13-42). If a current block is not found to line up well with a target block, but instead overlaps two vertically adjacent target blocks, then the two target blocks are included as candidate blocks (column 23: lines 1-55).

Regarding claims 26 and 44, a search frame may also be divided into vertical bands of size 8 x 16 pixels (column 7: lines 4-18; column 17: lines 11-36), that can be used if a current block is found to overlap two horizontally adjacent target blocks.

Regarding claims 27 and 45, if the best match for a current block is found to be both on a vertical border between an upper row and lower row of macroblocks, and a horizontal border between a left column and right column of macroblocks, then the sub-blocks that form the intersection of candidate blocks that align with the current block are used (column 20: lines 31-42).

Jung, Imao et al., and Hirabayashi disclose the claimed invention except for determining motion estimation by combined adjacent subblocks. Lempel teaches that it was known to perform a motion estimation search based on sets of two adjacent subblocks. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate an adjacent subblock motion estimation search into the motion vector detection system of Jung, as taught by Lempel, since Lempel states in column 5: lines 1-55 that such a modification would reduce error in performing motion estimation by enabling motion estimation to be done in the frequency domain.

Regarding claims 33-38 and 51-56, this is simply the next iteration of Imao et al. as applied to claims 20, 24-28, 39, and 42-46 above over an 8 x 8 subblock if it has been found that the 8 x 8 subblock is not uniform, that is, it does not have a single motion vector. Claims 33 and 51 correspond with claims 20 and 39; claims 34 and 52

with 24 and 42; claims 35 and 53 with 25 and 43; claims 36 and 54 with 26 and 44; claims 37 and 55 with 27 and 45; and claims 38 and 56 with 28 and 46.

Regarding claims 1 and 12, when N equals 2, the current picture becomes equivalent to an MPEG B frame, having 2 reference pictures. Also, it is inherent that if two sub blocks have the same motion vector, they have the same reference picture, and if two sub blocks have different reference pictures, they have different motion vectors. Then, the determination of if sub blocks have the same reference picture is considered equivalent to the determination if sub blocks have similar motion vectors. In other words, the method of claim 1 is considered equivalent to the method of claims 20 and 24-26 for a bidirectional picture, and the apparatus of claim 12 is considered equivalent to the apparatus of claims 39 and 42-44, previously rejected under Jung, Imao et al., Hirabayashi, and Lempel, for a bidirectional picture. It is noted that Lempel operates on MPEG data, and specifically states that "bi-directional pictures...require both a past and a future reference in order to be encoded" (column 2: lines 48-50).

Regarding claims 2 and 13, the method of grouping adjacent subblocks is equivalent to the dividing of search frames into horizontal or vertical strips or bands in Lempel.

Regarding claims 3 and 14, the further subdivision of first subblocks into second sub blocks if the first subblocks use different reference pictures is the second iteration of the division of an image in Imao et al., in which the test for uniformity of regions is if the regions have the same reference picture.

Regarding claims 4 and 15, Hirabayashi determines whether to subdivide a block by comparing the amount of data produced by the block and the combined data from the four subblocks from the division of the current block (column 3: lines 20-25), in a similar manner to claims 28 and 46 discussed above.

Regarding claims 5 and 16, in Jung, if a certain number of subblocks above a threshold have an identical displacement, then the motion vector for the panning block is the one taken for the panning block as a whole from the panning vector detector (column 4: lines 4-15), in a similar manner to claim 23 discussed above.

Regarding claims 6 and 17, in Jung, motion vectors are considered similar if they have an identical displacement (column 4: lines 30-44), in a similar manner to claims 29 and 47 discussed above.

Regarding claims 7 and 18, as mentioned above, Lempel divides 16 x 16 pixel target blocks into 8 x 8 subblocks (column 19: line 38), and recombines adjacent 8 x 8 subblocks into 16 x 8 or 8 x 16 horizontal bands (column 20: lines 5-20).

Regarding claims 8 and 19, Jung determines motion vector coding error "by employing any of the algorithms well known in the art" (column 4: lines 1-6). Although sum of absolute difference (SAD) is not given in the non-exhaustive list of error metrics provided, the examiner takes Official Notice that determining accuracy of motion estimation using a Sum of Absolute Difference measure was well-known in the art, if not the most common method, at the time the invention was made.

Regarding claim 9, Lempel states that coding a bi-directional MPEG picture requires two reference pictures (column 2: lines 48-50).

Regarding claims 10 and 11, the examiner takes Official Notice that it was known in the art that in encoding bidirectional pictures, that once a predetermined block mode for encoding a block has been determined, it would be expected to encode the block using the determined block mode.

Regarding claims 57 and 58, Lempel is embodied on a general purpose computer (column 8: line 15–column 9: line 35).

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David N. Werner whose telephone number is (571)272-9662. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri, can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. N. W./
Examiner, Art Unit 2621

/Mehrdad Dastouri/
Supervisory Patent Examiner, Art Unit 2621